

REMARKS

Entry of this Amendment is proper under 37 CFR §1.116, since Applicants submit that the introduction of newly-cited reference Grellmann et al. changes entirely the dynamics of the rejection currently of record. Accordingly, Applicants respectfully request that the finality of the rejection be withdrawn to permit the rejection currently of record to clearly identify the issues for appeal.

That is, Applicants submit that newly-cited Grellmann clearly confirms Applicants' position all along during prosecution that the previously-cited references are not relevant to the present invention, since these references are not concerned with controlling the impedance of a specific signal line by using a plurality of interconnect wires, as required by the plain meaning of the original claim language and as Applicants mentioned in the telephone interview dated August 16, 2006. Applicants submit that newly-cited Grellmann does indeed address this problem, but does so in a manner that clearly lacks the details of the present invention and in some ways teaches against the methods of the present invention.

As confirmed by the Examiner's response on pages 13 and 14 of the Office Action, the Examiner relies upon an interpretation that improperly dissociates the claim language, thereby ignoring its plain meaning, and/or ignores her own interpretation to the extent that it conforms with that of Applicants. There is clearly a difference of opinion as to the "broadest reasonable interpretation" of the claim language and such difference of opinion clearly requires attention of another objective party. However, before the rejection currently of record is in condition to be used in an appeal, it requires reworking by the Examiner, in view of newly-cited Grellmann.

Claims 1-4, 6-24, and 29-32 are all the claims presently pending in the application. Claims 5, 27, and 28 are canceled to expedite prosecution by incorporating their contents into independent claim 1 and into claim 29. Claims 25 and 26 are withdrawn, pending resolution of the propriety of the restriction requirement, which was timely traversed, and which matter will be further pursued once the allowable subject matter of the examined claims is determined.

It is noted that Applicants specifically state that no amendment to any claim herein should be construed as a disclaimer of any interest in or right to an equivalent of any element or feature of the amended claim.

Applicants gratefully acknowledge the Examiner's indication that claims 4, 6, 14, 16, 18,

21, 22, and 28-30 would be allowable if rewritten in independent form. However, Applicants respectfully submit that this listing of allowable subject matter needs to be revisited by the Examiner in view of newly-cited Grellmann, since this newly-cited reference clearly confirms Applicants' position that one having ordinary skill in the art would not agree with the rejection currently of record wherein wording of the references are taken out of the context of the references themselves. That is, newly-cited Grellmann clearly demonstrates the plain meaning of the language of the original independent claims that requires that a specific signal line be designed with a plurality of bonding wires to provide a desired impedance effect. As Applicants have stated repeatedly, none of the other references of the rejection currently of record address or even suggest this language that a specific signal line be configured for impedance by using a plurality of bonding wires.

Claims 1-3, 5, 7, 9, 12, 19, 24, and 27 stand rejected under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 6,084,295 to Horiuchi et al. Claim 23 stands under 35 U.S.C. § 102(b) as anticipated by U.S. Patent No. 5,294,897 to Notani et al.

Claim 8 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Horiuchi, further in view of US Patent Publication US 2004/0182911A1 to Chia et al. Claims 10 and 11 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Horiuchi, further in view of US Patent 3,840,169 to Steranko et al.

Claim 13 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Horiuchi, further in view of US Patent Publication US 2001/00154900A1 to Lee.

Claims 15 and 17 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Horiuchi, further in view of Notani. Claim 20 stands rejected under 35 U.S.C. § 103(a) as unpatentable over Horiuchi, further in view of US Patent 4,555,052 to Kurtz et al. Claims 31 and 32 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Horiuchi, further in view of newly-cited US Patent 4,686,492 to Grellmann et al.

These rejections are respectfully traversed in the following discussion.

I. THE CLAIMED INVENTION

As described and defined in, for example, claim 1, the present invention is directed to a method of making an electronic interconnection. For a signal line to be interconnected, a plurality of bonding wires is used in a configuration that provides a controlled impedance effect. A dielectric material is provided such that a predetermined distance is maintained by the dielectric material separating a first bonding wire and a second bonding wire of the plurality of bonding wires, to provide at least a part of the controlled impedance effect.

The conventional method of wire bonding, as described on page 2 of the specification, beginning at line 2, inherently represents a parasitic inductance that limits bandwidth signals when a single bonding wire is used for a signal. This problem has been addressed in various methods, including the use of flip chip and ball grid concepts or filling the transition region with a high dielectric constant material such as an epoxy containing a ceramic. However, these conventional methods are not always applicable and can be expensive to implement.

The claimed invention, on the other hand, introduces into the art the entirely different concept of using a plurality of bonding wires for a specific signal line. By appropriately configuring this plurality of bonding wires, the plurality of bonding wires provides a controlled impedance effect for that specific signal line. In practice, for any given signal connection, a typical configuration might use one bonding wire to carry the signal current and the other bonding wire to carry the return current, which can represent ground for a single ended signal and the complementary signal for a differential pair.

II. THE WITHDRAWAL OF CLAIMS 25 AND 26

The Examiner has made final the restriction for claims 25 and 26. Applicants decline to cancel these claims at this time, since a Petition to withdraw this restriction will be filed once the allowable subject matter of the active claims is established, for the reasons already of record.

III. THE PRIOR ART REJECTIONS

The Examiner alleges that Horiuchi anticipates claims 1-3, 5, 7, 9, 12, 19, 24, and 27, and when further modified by Chia, renders obvious claim 8, when further modified by Steranko, renders obvious claims 10 and 11, when further modified by Lee, renders obvious claim 13, when further modified by Notani, renders obvious claims 15 and 17, when further modified by Kurtz, renders obvious claim 20, and, when further modified by newly-cited Grellmann, renders obvious claims 31 and 32. The Examiner further alleges that Notani anticipates claim 23.

Applicants again submit that there are elements of the claimed invention which are neither taught nor suggested by Horiuchi, Notani, or newly-cited Grellmann, when properly interpreted.

Applicants submit that newly-cited Grellmann is the only reference currently of record that is reasonably directed to the plain meaning of the claimed invention. That is, Grellmann Figures 1 and 2 clearly show a signal line 20 using a plurality of bonding wires 28a, 28b, 28c configured to provide a controlled impedance effect for that signal line 20, with additional layers (e.g., 34a, 34b, 34c) added to adjust the impedance for that signal line 20. However, Grellmann clearly does not teach or suggest co-dispensing the plurality of bonding wires, as is clear from the description at lines 3-8 of column 5. Nor does Grellmann teach or suggest using a dielectric material between these bonding wires used for the specific signal line 20. Indeed, Grellmann clearly teaches that the method of adjusting the impedance level is by additional layers of bonding wires, as clearly described at lines 47-66 of column 4.

Thus, Grellmann clearly teaches a different method of achieving a desired impedance for a specific signal line by using a plurality of bonding wires for that signal line. The present invention teaches co-dispensing the plurality of bonding wires at a predetermined distance apart, along with using a dielectric to maintain this predetermined distance and to become a factor in the impedance value for the signal line.

Hence, turning to the clear language of the claims, in Grellmann there is no teaching or suggestion of: "... providing a dielectric material such that a predetermined distance is maintained by said dielectric material separating a first bonding wire and a second bonding wire of said plurality of bonding wires to provide at least a part of said controlled impedance effect", as required by independent claim 1. The remaining independent claims have similar language.

Therefore, Applicants respectfully submit that the present invention is clearly patentable over Grellmann.

The rejection based on Horiuchi

Turning now to the rejection currently of record based on Horiuchi for claims 1-3, 5, 7, 9, 12, 19, 24, and 24, beginning on page 2 of the Office Action, this reference Horiuchi arguably does show a plurality of bonding wires 20, an electro-conductive resin 34, and a resin coating 32. However, the description at lines 29-33 of column 5 (e.g., to which the Examiner points) clearly fails to suggest using a plurality of these wire bonds 20 for a single signal line, as required by even the original claim language. Lines 29-33 of Horiuchi recite: *"In the case wherein the electro-conductive resin 34 is set at the ground potential so that the respective bonding wires 20 operate as a coaxial cable line, it is possible to make the impedance-matching as a signal line by the selection of material (dielectric constant) and/or thickness of the resin coating 32 covering the conductive wire."*

Applicants submit that these lines do not suggest using multiple ones of the plurality of bonding wires 20 for a specific single signal line. Indeed, Applicants submit that one having ordinary skill in the art would agree with Applicants that, in order to satisfy the plain meaning of the language of the independent claims, the "coaxial cable line" of Horiuchi would have to be constructed so that the ground return is actually one of the bonding wires 20, not the electro-conductive resin 34, as is used in Horiuchi's "coaxial cable line."

In her response in the second paragraph on page 13 of the Office Action, the Examiner points to lines 15-33 of column 5. However, the only other location in these lines (other than the description at lines 29-33) that would seem reasonably related to the issue of using more than one bonding wire for a single signal line would be that at lines 18-27: *"The electro-conductive resin 34 having a good thermal conductivity used as a shield enhances the heat dissipation from the semiconductor chip 10, thereby enabling the semiconductor chip 10 of large heat generation to be easily mounted and causes the respective bonding wires 20 to constitute a coaxial cable line if the electro-conductive resin 34 is set at a ground potential, thereby improving the electrical characteristic of the device for signals transmitted through the bonding wires 20."*

However, Applicants submit that this description merely states that the wire bonds

embedded in resin coating 32 can be considered as a coaxial cable if the electro-conductive resin 34 is grounded. Again, this use of resin layer 34 as ground does not suggest using multiple ones of the bonding wires 20 to be dedicated to a single signal line, let alone configuring multiple ones of wire bonds of a single signal line for cause an impedance effect for that signal line.

At the bottom of the second paragraph on page 13, the Examiner alleges: *“Therefore, the resin contributes to the “configuration” of the bonding wires and overall the “configuration” of the signal line, and it is reasonable to anticipate the broadly claimed limitation of claim 1.”*

In response, Applicants again submit that this characterization fails to satisfy the plain meaning of the claim language, wherein the Examiner’s initial burden is to point to at least one specific single signal line in Horiuchi for which multiple bonding wires 20 are configured to provide a controlled impedance effect for that specific signal line. Applicants submit that the configuration of merely having multiple bonding wires 20 and using dielectric resin 32 and grounded electro-conductive resin 34 fails to demonstrate one of these signal lines as using more than one bonding wire to provide a controlled impedance effect for that signal line.

Horiuchi merely teaches a “miniature coaxial cable” wherein a plurality of signal lines are embedded in a dielectric material and there is a ground plane formed by the resin 34. There is no suggestion in Horiuchi to use a plurality of lines to form a single signal line in its miniature version of a “coaxial cable line”, as would be required to satisfy the independent claim language. Applicants further submit that a standard coaxial cable does not typically have such variation wherein a plurality of cable lines are configured to interact as to form a signal line having a controlled impedance for that signal line.

Hence, turning to the clear language of the claims, in Horiuchi there is no teaching or suggestion of: “...for a signal line to be interconnected, using a plurality of bonding wires configured to provide a controlled impedance effect ...”, as required by independent claim 1.

Therefore, Applicants again respectfully submit that Horiuchi does not anticipate the invention described in the independent claims, since there is no suggestion to use more than one of the bonding wires 20 to be dedicated to a specific signal line, let alone a plurality of bonding wires having a configuration that provides an impedance effect for that specific signal line.

The rejection based on Notani

Relative to Notani, although this reference arguably shows a plurality of bonding wires 2a, 2b in Figures 1(a), 4(b), 6, 7, 8, and 10, that are used for a single signal, these bonding wires are not described as being designed with a separation (or other configuration) that provides an impedance effect for that signal line. That is, the two “metal wires”, as these conductors 2a and 2b are described at line 35 of column 9 and line 15 of column 10, are merely used as conductive interconnects for the signal line. There is no suggestion in Notani that the distance separating these two wires is significant in determining the impedance effect for the signal line.

Moreover, Notani fails to suggest co-dispensing a dielectric for the metal wires 2a, 2b.

Therefore, Applicants submit that claim 23 is clearly patentable over Notani.

Thus, Applicants submit that there are elements of the claimed invention that are not taught or suggested by Horiuchi, Notani, or Grellmann, and all claims are clearly patentable over these references. Therefore, the Examiner is respectfully requested to withdraw the rejections based on these references.

IV. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1-4, 6-24, and 29-32, all the claims presently being examined in the application, are patentably distinct over the prior art of record and are in condition for allowance.

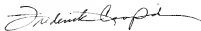
The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

Serial No. 10/722,432
Docket No. YOR920030378US1 (YOR.489)

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Assignee's Deposit Account No. 50-0510.

Respectfully Submitted,



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CERTIFICATION OF TRANSMISSION

I certify that I transmitted via EFS this Amendment under 37 CFR §1.116 to the USPTO on February 6, 2007.



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